

BEST AVAILABLE COPY

(12) INTERNATIONAL APPLICATION PUBLISHED UNDER THE PATENT COOPERATION TREATY (PCT)

(19) World Intellectual Property Organization
International Bureau



(43) International Publication Date
15 August 2002 (15.08.2002)

PCT

(10) International Publication Number
WO 02/062524 A1

(51) International Patent Classification⁷: **B24B 7/18,**
41/047

(21) International Application Number: PCT/SE02/00124

(22) International Filing Date: 25 January 2002 (25.01.2002)

(25) Filing Language: Swedish

(26) Publication Language: English

(30) Priority Data:
0100416-7 6 February 2001 (06.02.2001) SE

(71) Applicants and

(72) Inventors: **THYSELL, Håkan** [SE/SE]; Ågatan 25 A,
S-614 34 Söderköping (SE). **THYSELL, Karl** [SE/SE];
Skönbergagatan 3, S-614 30 Söderköping (SE).

(74) Agent: **WILLQUIST & PARTNERS PATENTBYRÅ**
AB; Platensgatan 9C, S-582 20 Linköping (SE).

(81) Designated States (*national*): AE, AG, AL, AM, AT, AU,
AZ, BA, BB, BG, BR, BY, BZ, CA, CH, CN, CO, CR, CU,
CZ, DE, DK, DM, DZ, EC, EE, ES, FI, GB, GD, GE, GH,
GM, HR, HU, ID, IL, IN, IS, JP, KE, KG, KP, KR, KZ, LC,
LK, LR, LS, LT, LU, LV, MA, MD, MG, MK, MN, MW,
MX, MZ, NO, NZ, OM, PH, PL, PT, RO, RU, SD, SE, SG,
SI, SK, SL, TJ, TM, TN, TR, TT, TZ, UA, UG, US, UZ,
VN, YU, ZA, ZM, ZW.

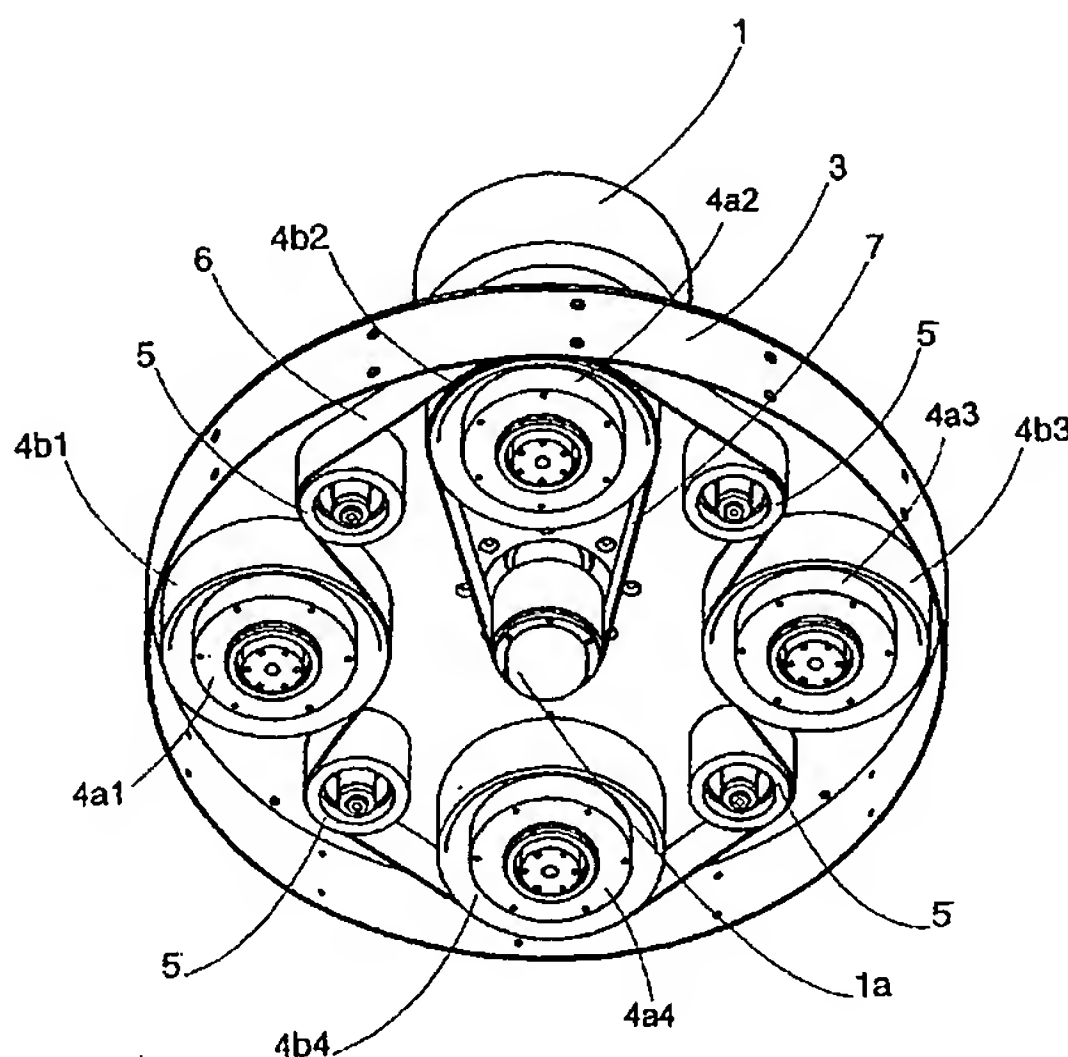
(84) Designated States (*regional*): ARIPO patent (GH, GM,
KE, LS, MW, MZ, SD, SL, SZ, TZ, UG, ZM, ZW),
Eurasian patent (AM, AZ, BY, KG, KZ, MD, RU, TJ, TM),
European patent (AT, BE, CH, CY, DE, DK, ES, FI, FR,
GB, GR, IE, IT, LU, MC, NL, PT, SE, TR), OAPI patent
(BF, BJ, CF, CG, CI, CM, GA, GN, GQ, GW, ML, MR,
NE, SN, TD, TG).

Published:

— with international search report

For two-letter codes and other abbreviations, refer to the "Guid-
ance Notes on Codes and Abbreviations" appearing at the begin-
ning of each regular issue of the PCT Gazette.

(54) Title: ARRANGEMENT IN A MOBILE MACHINE FOR SCREEDING FLOOR SURFACES



(57) Abstract: The invention relates to an arrangement in a mobile machine for screeding floor surfaces. This comprises a housing with a planet disk (3), which is rotatably supported in the bottom of the said housing and driven by a drive motor (1). The planet disk carries a number of rotatably supported screeding disks, distributed over the planet disk (3) and operatively connected to the drive motor (1). According to the invention the number of screeding disks is an even number up to a maximum of six. Viewed in the direction of rotation of the planet disk (3), half the number of screeding disks have a direction of rotation coinciding with the planet disk (3) and the remaining screeding disks an opposing direction of rotation.



WO 02/062524 A1

Arrangement in a mobile machine for screeding floor surfaces

The present invention relates to an arrangement according to the pre-characterising clauses of claims 1 and 3.

Reference is made to US 5637032 A, US 1069803 A, US 4097950 A, FR 2073627 A5, and FR 1108781 A as examples of the prior art.

screeding machines of the aforementioned type function inherently well, but as the material in the screeding disks used to machine the floor surfaces is progressively developed, thereby enabling it to remove more floor material per unit time than before, there is a desire for more available power for machining of the floor material.

The object of the present invention is to produce an arrangement in a screeding machine of the type referred to in the introductory part, which has an improved removal capability compared to known screeding machines. This is achieved in that the arrangement has the characteristic features specified in the characterising part of claims 1 and 3.

The arrangement according to the invention furthermore has one or more of the characteristic features specified in the subordinate claims.

The invention moreover affords the following advantages:

The screeding machine designed according to the invention has an improved balance and reduced lateral rotation, which especially in the case of a manually operated machine makes it easier to hold and control. More even screeding is achieved; with known machines it is easy to end up with a machining mark having a plate-shaped cross-section, which means that it is necessary to screed with a relatively large overlap, in order to obtain a plane finish.

The invention will be explained in more detail below with reference to the drawing attached, in which fig. 1a, in an oblique, perspective view from beneath, shows by way of example a screeding unit in a screeding machine according to the invention, having a drive motor and a dished planet disk, which accommodates a belt transmission. Fig. 1b shows the drive motor and the planet disk in fig. 1a in an oblique perspective view from above. Fig. 1c shows essentially the same view as fig. 1a, but the planet disk and the belt transmission are covered by a cover plate with openings for the machine's screeding disks. Fig. 2, by way of an example, shows a plan view of a system of belts for driving the screeding machine planet

disk and screeding disks of the type used in the embodiment according to figures 1a, 1b. Fig. 3 in a side view illustrates an embodiment of a screeding unit according to the invention, in which the screeding unit planet disk is driven by a separate drive motor.

In figures 1a, 1b, 1 denotes a drive motor mounted on a motor plate 2. The motor plate 2 is designed to be fitted in a screeding machine casing, not shown further, by means of a screw nut connection.

3 denotes a planet disk, which is supported so that it can rotate in relation to the motor plate 2 and is shaped like a dish open at the bottom. When the screeding unit is ready for use the dish is covered by a protective plate having openings for the screeding disks. The dish with the protective plate forms a protected space for the drive mechanism, as will be explained below. This space accommodates four symmetrically located holders 4a1-4a4 for screeding disks 4c1-4c4, the holders being supported so that they can rotate, in the planet disk 3. For the sake of clarity, the screeding disks have been omitted from fig. 1a but are shown in fig. 1c, in which the directions of rotation, according to the invention, of the screeding disks 4c1-4c4 and the planet disk 3 are also illustrated by arrows 3p and 4p respectively. 3a denotes a plate having openings for the screeding disks 4c1-4c4, designed to protect the belt transmissions in the dished planet disk 3. A belt sheave 4b1-4b4 is connected to each holder 4a1-4a4 for driving each screeding disk in the manner characteristic of the invention. A belt 6 runs over the belt sheaves 4b1-4b4 and over deflection sheaves 5 arranged between them. A belt sheave 1a arranged on the shaft of the motor 1 is designed to drive the belt sheave 4b2 by way of a belt 7, thereby causing the other belt sheaves to rotate. Since the belt 6 runs over that section of the circumference situated nearest to the centre of the planet disk 3 in respect of the belt sheaves 4b1 and 4b3 and over the section of the circumference situated furthest away from the said centre in respect of the belt sheaves 4b2 and 4b4, the belt sheaves 4b1, 4b3 assume opposing directions of rotation relative to the belt sheaves 4b2, 4b4, thereby providing the characteristic feature of the present invention, namely that adjacent screeding disks have opposite directions of rotation.

From fig. 1b it can be seen that shafts of the belt sheaves 4b1, 4b3 protrude from the dished planet disk 3 and form belt sheaves 8. 9 denotes a belt sheave fixed to the motor plate 2. A belt 10, by means of which the rotation of the motor 1 is transmitted to the planet disk 3 by way of the belt sheave 1a, the belt 7, the belt sheave 4a2, the belt 6 and the belt sheaves 4b1, 4b3, runs over the belt sheaves 8 and 9. It may be noted in this connection that the planet sheave 3 has the same direction of rotation as the screeding disks 4c2, 4c4. From this it

follows that these screeding disks in an area furthest away from the centre of the planet disk 3 have a higher peripheral speed in relation to a surface that is to be screeded than do the screeding disks 4c1, 4c3 in the same area. If so required, this can, as the person skilled in the art will appreciate, be compensated for by giving the belt sheaves 4b1, 4b3 and 4b2, 4b4 correspondingly different diameters. For the sake of clarity all belts and belt sheaves are drawn in fig. 2.

The person skilled in the art will also appreciate that some or all of the belt transmissions may be replaced by gear transmissions or transmissions having a frictional engagement.

It will also be appreciated that, without departing from the idea of the invention, six screeding disks supported by holders may be arranged on the planet wheel 3, each holder being connected to a belt sheave. A belt runs over the belt sheaves and over intermediate deflection sheaves in the manner already explained, which means that adjacent screeding disks have opposite directions of rotation. At the same time the planet disk carrying the screeding disks is driven in the same way as explained earlier. In this embodiment also, the belt transmissions can be replaced wholly or in part by gear transmissions or transmissions having a frictional engagement.

In a particular embodiment of the arrangement according to the invention, the planet disk 3 is driven by its own motor 11. The belt 10, which in the embodiment according to figures 1a, 1b runs over belt sheaves 8, then runs instead over the belt sheave 11a of the motor 11. Separate driving of the planet disk 3 affords two advantages: firstly it is possible to freely select the direction of rotation of the planet disk 3 and secondly the speed of rotation can be selected irrespective of the speed of the screeding disks, in order to obtain the optimum screeding result. A gear transmission can obviously also be used in this embodiment instead of the belt transmission.

Although the invention above has been primarily illustrated and explained in connection with a screeding unit for a manually operated screeding machine, it will be obvious that the screeding unit according to the invention affords the same advantages when it is fitted to a powered screeding machine. It is also advantageous here that lateral forces occurring are minimised and that the effective screeding profile of the screeding unit permits screeding with little overlap.

Claims

1. Arrangement in a mobile machine for screeding floor surfaces comprising a housing with a planet disk (3), which is rotatably supported in the bottom of the said housing and driven by a drive motor (1), and which carries an even number of up to six but not less than four screeding disks, operatively connected to the drive motor (1) and defining one screeding plane, **characterised in that** the operative connection comprises, on the one hand, belt sheaves (4b1-4b4) belonging to the screeding disks, over which sheaves and over deflection sheaves (5) arranged between the belt sheaves a belt (6) runs in such a way that the belt (6) bears against a part of the circumference of the belt sheaves, which alternating from belt sheave to belt sheave lies alternately closest to the centre of the planet disk (3) and furthest away from the said centre, and on the other a belt (7), which runs between a belt sheave 1a arranged on the shaft of the motor (1) and one of the belt sheaves (4b1-4b4) belonging to the screeding disks.
2. Arrangement according to claim 1, **characterised in that** the screeding disks that have a direction of rotation opposed to the planet disk (3) have a rotational speed, which is so much greater than the rotational speed of the screeding disks that have the same direction of rotation as the planet disk, and that at the periphery of the planet disk all screeding disks have approximately the same peripheral speed in relation to the surface that is to be screeded.
3. Arrangement in a mobile machine for screeding floor surfaces comprising a housing with a planet disk (3), which is rotatably supported in the bottom of the said housing and which carries a number of rotatably supported screeding disks, distributed over said planet disk and operatively connected to a drive motor (1), and defining one screeding plane, **characterised in that** the planet disk (3) is operatively connected to a second drive motor, intended solely for driving the planet disk (3), and that the number of screeding disks constitutes an even number up to a maximum of six, and that, viewed in the direction of rotation of the planet disk (3), half the number of screeding disks have a direction of rotation coinciding with the planet disk (3) and the remaining screeding disks an opposing direction of rotation.
4. Arrangement according to claim 3, **characterised in that** the operative connection between the planet disk (3) and its drive motor comprises a belt or gear transmission.

Fig 1a

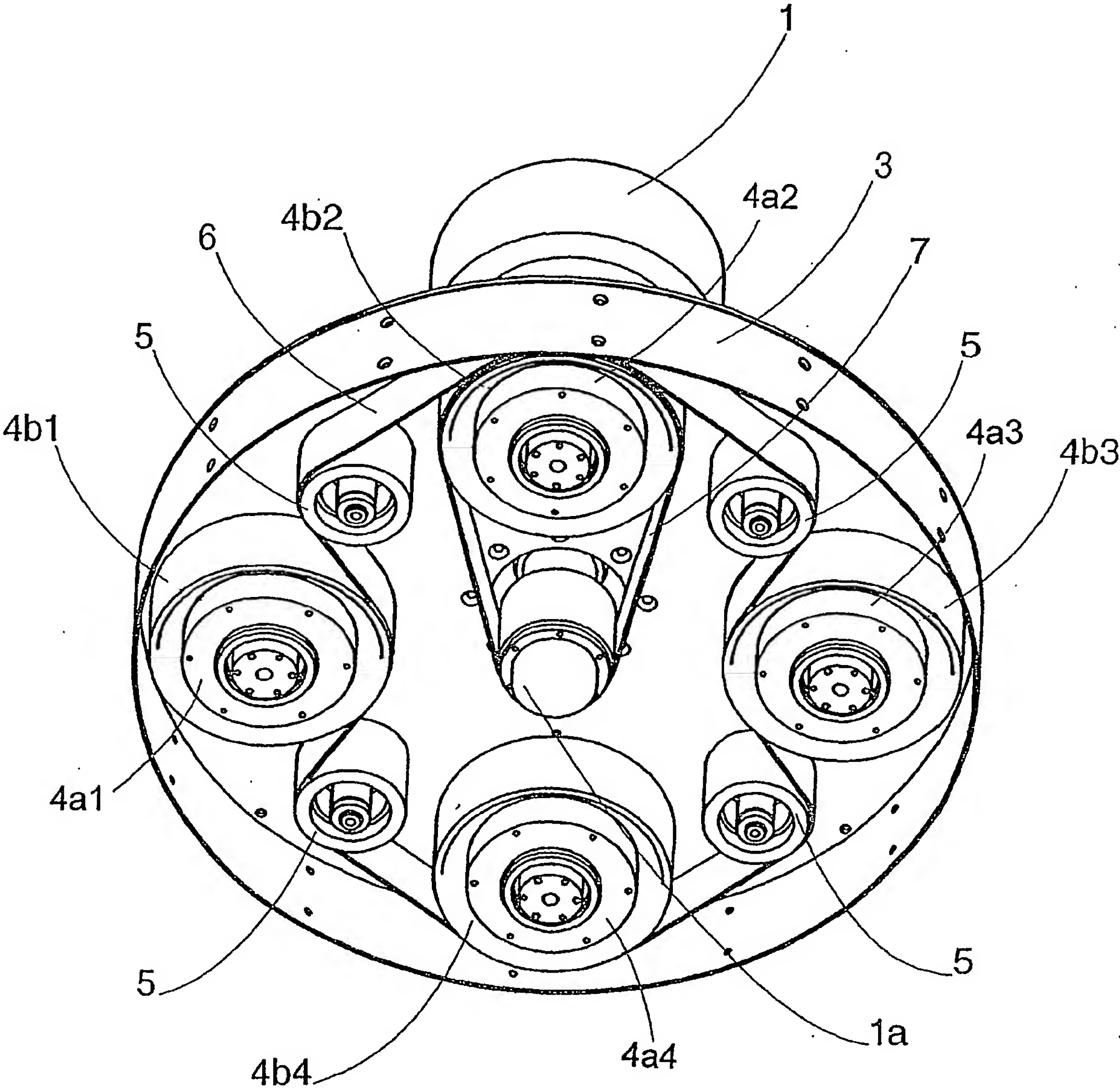


Fig 1b

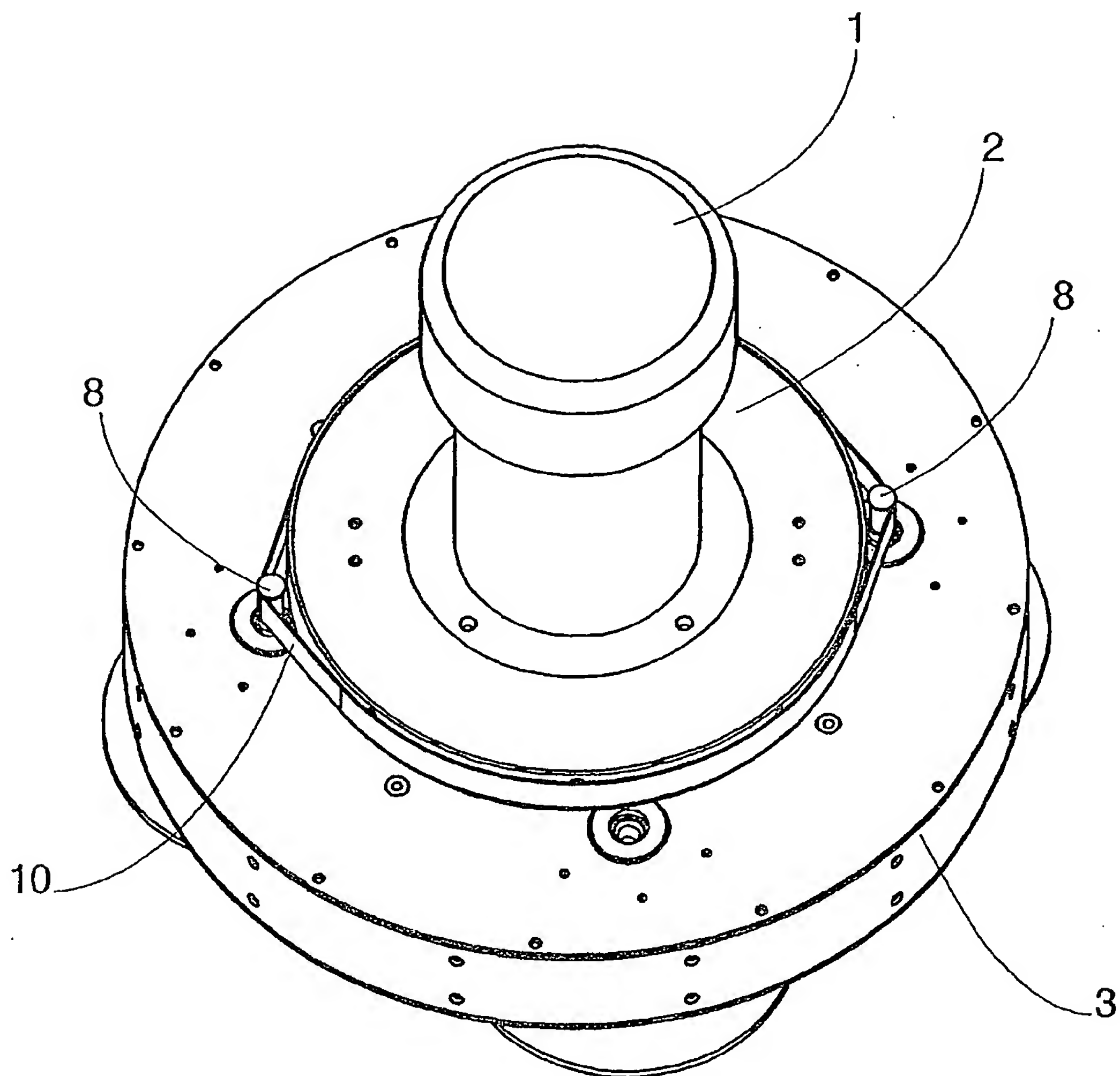


Fig 1c

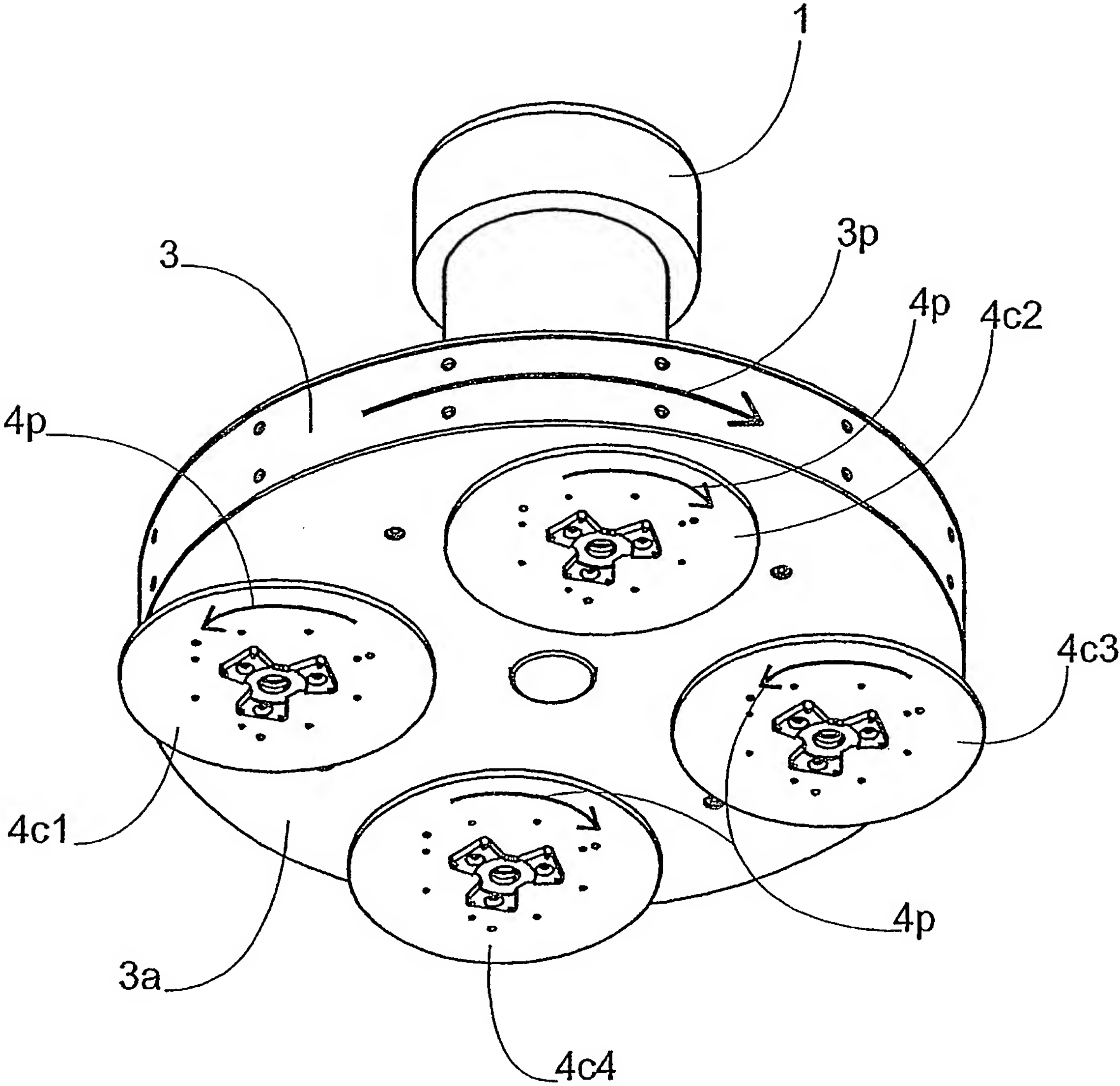


Fig 2

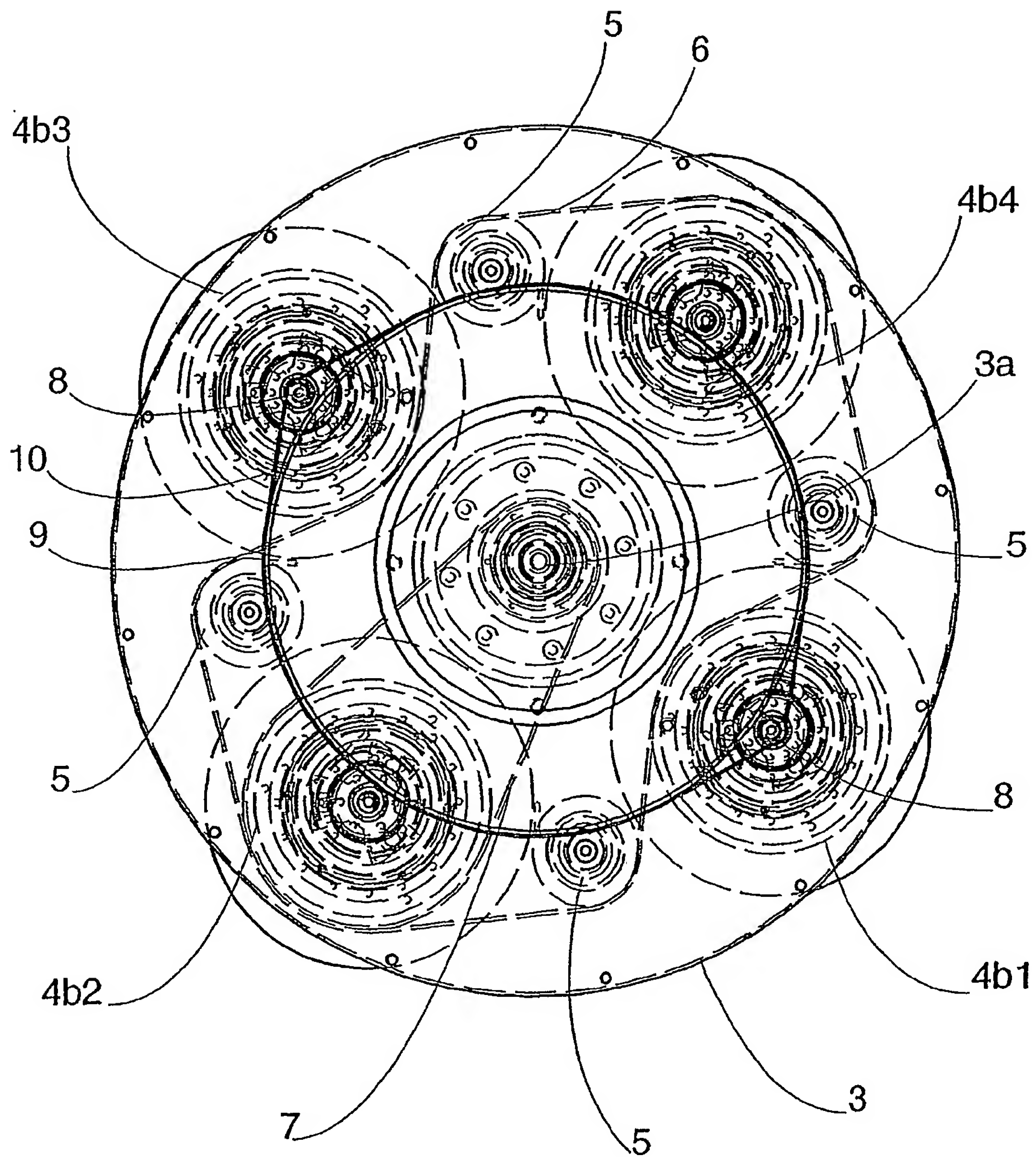
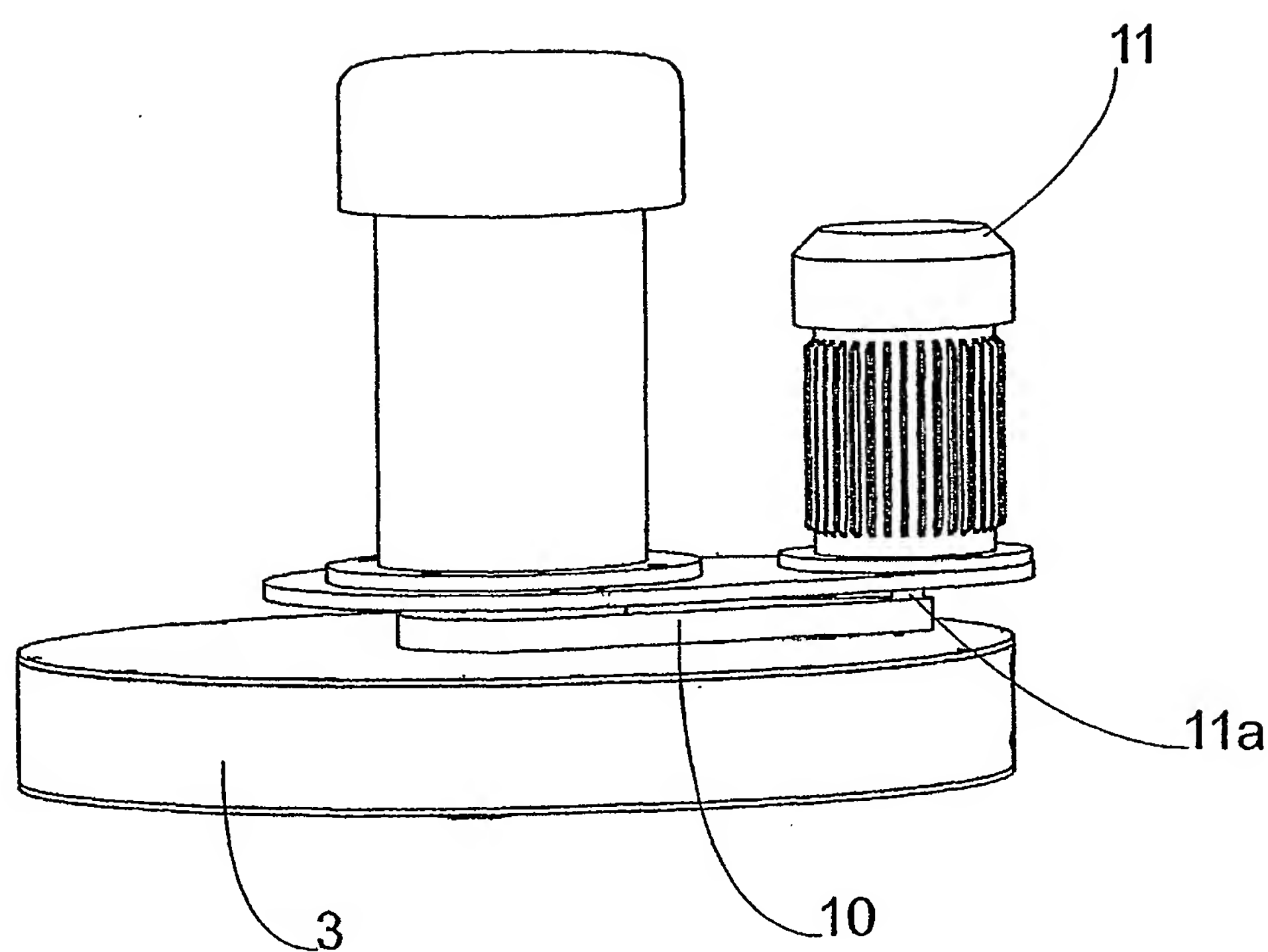


Fig 3



INTERNATIONAL SEARCH REPORT

International application No.

PCT/SE 02/00124

A. CLASSIFICATION OF SUBJECT MATTER

IPC7: B24B 7/18, B24B 41/047

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)

IPC7: B24B

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

SE,DK,FI,NO classes as above

Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)

EPO-INTERNAL, WPI DATA

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	US 1069803 A (H.J. NELSON, T.W. BLACK, & O. ZAPFE), 12 August 1913 (12.08.13), page 1, line 30 - line 91, figures 1-3 --	1-4
A	US 3452486 A (J.M. LOMBARDO ET AL), 1 July 1969 (01.07.69), figures 5,7 --	1-4
A	US 4097950 A (LARRY S. SATTERFIELD), 4 July 1978 (04.07.78), column 2, line 58 - line 64; column 3, line 8 - line 13, figures 2,3 --	1-4

☒ Further documents are listed in the continuation of Box C.☒ See patent family annex.

* Special categories of cited documents:

- "A" document defining the general state of the art which is not considered to be of particular relevance
- "E" earlier application or patent but published on or after the international filing date
- "L" document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)
- "O" document referring to an oral disclosure, use, exhibition or other means
- "P" document published prior to the international filing date but later than the priority date claimed

"T" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention

"X" document of particular relevance: the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone

"Y" document of particular relevance: the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art

"&" document member of the same patent family

Date of the actual completion of the international search

6 May 2002

Date of mailing of the international search report

14-05-2002

Name and mailing address of the ISA/
Swedish Patent Office
Box 5055, S-102 42 STOCKHOLM
Facsimile No. +46 8 666 02 86

Authorized officer

Anders Brinkman/MP
Telephone No. +46 8 782 25 00

INTERNATIONAL SEARCH REPORT

International application No.

PCT/SE 02/00124

C (Continuation). DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	FR 1108781 A (M. GEORGES-FERNAND BRENDÉL), 17 January 1956 (17.01.56), page 2, line 27 - page 3, line 2, figures 3,4,7-9 --	1-4
A	FR 2073627 A5 (LAZZARI GIOSUE MARIO ET AL), 1 October 1971 (01.10.71), figures 1-3, claim 1 -- -----	1-4

INTERNATIONAL SEARCH REPORT
Information on patent family members

28/01/02

International application No.
PCT/SE 02/00324

Patent document cited in search report			Publication date	Patent family member(s)		Publication date
US	1069803	A	12/08/13	NONE		
US	3452486	A	01/07/69	NONE		
US	4097950	A	04/07/78	NONE		
FR	1108781	A	17/01/56	NONE		
FR	2073627	A5	01/10/71	BE	760052 A	17/05/71

**This Page is Inserted by IFW Indexing and Scanning
Operations and is not part of the Official Record**

BEST AVAILABLE IMAGES

Defective images within this document are accurate representations of the original documents submitted by the applicant.

Defects in the images include but are not limited to the items checked:

- ☐ **BLACK BORDERS**
- ☐ **IMAGE CUT OFF AT TOP, BOTTOM OR SIDES**
- ☐ **FADED TEXT OR DRAWING**
- ☐ **BLURRED OR ILLEGIBLE TEXT OR DRAWING**
- ☐ **SKEWED/SLANTED IMAGES**
- ☐ **COLOR OR BLACK AND WHITE PHOTOGRAPHS**
- ☐ **GRAY SCALE DOCUMENTS**
- ☐ **LINES OR MARKS ON ORIGINAL DOCUMENT**
- ☐ **REFERENCE(S) OR EXHIBIT(S) SUBMITTED ARE POOR QUALITY**
- ☐ **OTHER:** _____

IMAGES ARE BEST AVAILABLE COPY.

As rescanning these documents will not correct the image problems checked, please do not report these problems to the IFW Image Problem Mailbox.